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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/775,664	02/05/2001	Paul Kevin Shufflebotham	015290-508	9320

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EXAMINER
ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
1763	13

DATE MAILED: 02/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/775,664	SHUFFLEBOTHAM ET AL.	
	Examiner	Art Unit	
	Rudy Zervigon	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 December 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *50-53 and 55-71* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *50-53 and 55-71* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 50-53, 55-58, 60-62, 64, and 65-71 are rejected under 35 U.S.C. 102(a) as being anticipated by Suzuki et al (U.S.Pat. 5,522,934). Suzuki et al teaches an PECVD (column 4, lines 5-18) ICP reactor (Fig.8) with a plasma processing chamber (4, Fig.8; column 3, lines 55-57). A ceramic ("anodized aluminum"; column 4, lines 19-25) substrate holder (6, Fig. 2, 8) is shown (column 4, lines 19-36) supporting a substrate ("W") within the processing chamber with an electrode (18) buried within the ceramic material (6). An electrically-conductive planar coil (22, Figure 8) disposed outside the process chamber (column 12, lines 23-27) and connected to an RF energy source (32, Fig.8) for energizing the process gas into a plasma state. A process gas distribution system (Figure 11; column 10, lines 33-43) for gas introduction into the process chamber (4, Figure 8). The process gas distribution system comprising injectors (64B of 56B; Figure 8, 11) with orifice (58B; Figure 9, 11) which direct the process gas along an axis that intersects the substrate at an acute angle, each of the injectors being spaced outwardly from the periphery of the substrate (Figure 8, 11). Suzuki further teaches wafer temperature control means (column 4, lines 45-55; column 13, line 62 – column 14, line 4).

51, 52 – Suzuki additionally teaches silane and oxygen as described in the specification (column 6, line 51). With regard to Suzuki not teaching phosphorous and boron containing gases, it is inherant in Suzuki's apparatus that phosphorous and boron containing gases can be used.

55 – Suzuki further teaches operating pressures of about 1mTorr (column 16, lines 38-44).

56 - Suzuki further teaches a ceramic ("anodized aluminum"; column 4, lines 19-25) substrate holder (6, Fig. 2, 8) is shown (column 4, lines 19-36) supporting a substrate ("W") within the processing chamber with an electrode (18) buried within the ceramic material (6).

57 - Suzuki further teaches a process gas distribution system for introducing the process gas wherein the gas supply includes orifices (36a-c, 44; Figure 2), and at least some of the orifices orientating the process gas along an axis of injection which intersects an exposed surface of the substrate at an acute angle – column 10, lines 28-33

60-62, – Suzuki further teaches a process gas distribution system for introducing the process gas comprising a primary (56A, 58A of 54; Figure 10, 11) and secondary gas rings (60, 62 of 54; Figure 10, 11) that directs the process gas toward the substrate (column 10, lines 28-33) along injectors (64A,B; Figure 9; column 10, lines 10-20).

64 - Suzuki further teaches peripheral injection means peripheral to the substrate – Figure 4

67 - Suzuki further teaches an RF bias power source ("power supply (not shown)"; column 4, lines 42-54) connected to the electrode (18, Figure 2), wherein the RF bias power source is operable to regulate a level of RF bias applied to the substrate so as to control the substrate temperature (column 4, lines 42-54).

71 – the plurality of gas flows (from each of the injectors) overlap each other in a plane parallel to an exposed surface of the substrate (Figures 8-11)

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 59 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al (U.S.Pat. 5,522,934) in view of Ishikawa et al (USPat. 6,143,078). Suzuki is discussed above. However, Suzuki does not teach that the orifice of his injectors direct the process gas in a upward direction away from the substrate. Ishikawa teaches a similar gas injection manifoild (Figure 9). Inclusive, Ishikawa teaches the orifice of his injectors (402, Figure 9) direct the process gas in a upward direction away from the substrate (compare Figure 9 and Figure 2)

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Suzuki to optimize the angle of his injectors so the process gas is directed in a upward direction away from the substrate as taught by Ishikawa.

Motivation for Suzuki to optimize the angle of his injectors so the process gas is directed in a upward direction away from the substrate is to optimize the flow of the process gas as taught by Ishikawa.

Response to Arguments

5. Applicant's arguments filed December 2, 2002 have been fully considered but they are not persuasive.

6. Applicant's arguments are directed solely to the amendments filed in the response to the nonfinal rejection (paper 10). Applicant is directed to the body of the above rejections.

Conclusion

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USPat. 5,885,358; 5,772,771; 5,614,055; 5,290,993; 6,070,551.

2. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am

through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311. The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.

JEFFRIE R. LUND
PRIMARY EXAMINER